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Experimental approach to three-nucleon forces – recent topics -

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Understanding the strong nuclear force is fundamental to understanding the formation of matter in the Universe. Since Yukawa's meson theory, the nuclear force has been formulated in terms of two-nucleon interactions. Three-nucleon forces (3NFs), which appear when more than two nucleons interact, have been revealed in the last two decades. The establishment of high-precision two-nucleon potentials and the achievements of the ab-initio calculations with these forces suggest the necessity of 3NFs in describing various nuclear phenomena, including the equation of the state of nuclear matter.

Few nucleon systems offer opportunities to investigate three-nucleon forces by directly comparing rigorous numerical calculations with high-precision experimental data. To explore the 3NFs, experimental programs using the polarized beam and polarized target systems are in progress at RIKEN and RCNP in Japan. I will review the three-nucleon force study from an experimental point of view and discuss the impact of these forces in nuclear physics and related fields.

Primary author: SEKIGUCHI, Kimiko (Institute of Science Tokyo)

Presenter: SEKIGUCHI, Kimiko (Institute of Science Tokyo)

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